

# MultiModem® ISI

ISI5634UPCI & ISI9234PCle Server Cards  
Intelligent Serial Interface



## User Guide



## MultiModem® ISI User Guide

**Models: ISI9234PCIe-4 & -8, ISI5634UPCI-4 & -8**

### S000442G, Revision G

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## Record of Revision

Revision	Date	Description
C	06/06/08	Remove ISI4604/8 Serial Cards, add procedures for Windows Server 2008 32-bit and 64-bit driver installation, and change Windows XP, 2003, and 2000 driver installation procedures.
	05/15/09	Added web link for warranty information.
D	10/07/09	Added Support Portal link and updated FCC and EMC statements.
E	05/21/10	Added Windows Installer procedures.
F	08/30/11	Removed CD references. Updated Windows installer process and removed manual installation processes.
G	02/20/12	Updated dimensions.

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This device covered by one or more of the following patents: 6,031,867; 6,012,113; 6,009,082; 5,905,794; 5,864,560; 5,815,567; 5,815,503; 5,812,534; 5,809,068; 5,790,532; 5,764,628; 5,764,627; 5,754,589; 5,724,356; 5,673,268; 5,673,257; 5,644,594; 5,628,030; 5,619,508; 5,617,423; 5,600,649; 5,592,586; 5,577,041; 5,574,725; 5,559,793; 5,546,448; 5,546,395; 5,535,204; 5,500,859; 5,471,470; 5,463,616; 5,453,986; 5,452,289; 5,450,425; D353,598; 5,355,365; 5,309,562; 5,301,274; 7082106; 7082141; 7092406. Other Patents Pending.

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# Chapter 1 – Introduction and Description

This manual describes the Multi-Tech Intelligent Serial Interface, Server Cards Models ISI5634UPCI-4/8 and ISI9234PCI-E-4/8. The UPCI Cards install on Universal PCI-bus architecture and the PCI Express cards install on PCI Express-bus architecture.

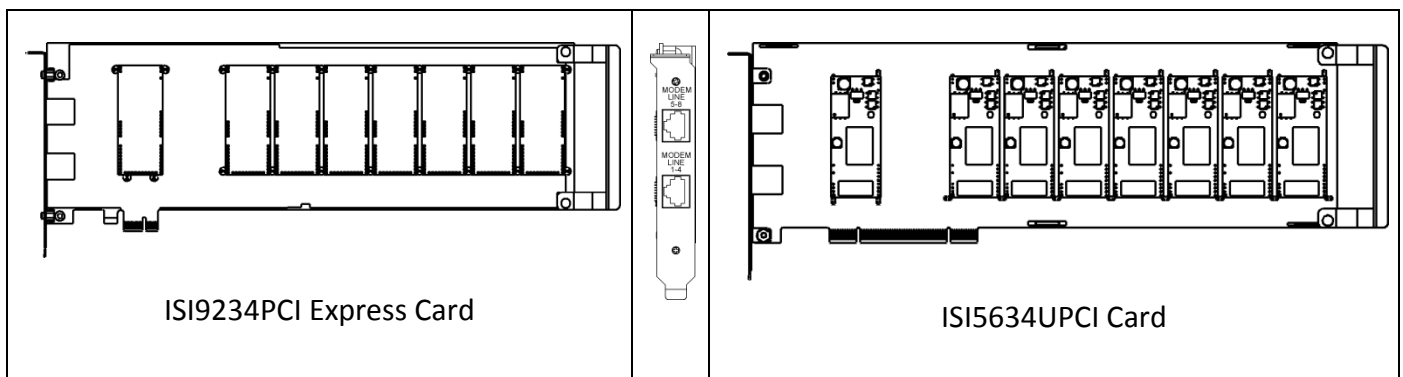
We assume that you have basic PC skills. Therefore, we have not included step-by-step instructions for basic computer operations.

## ISI Server Cards

The ISI Server Card model ISI5634UPCI uses Universal PCI-bus architecture. The ISI9234PCIe uses PCI Express-bus architecture. The -4 ISI Server card is a server modem expansion card with four V.92 data/Super G3 fax modems. The -8 ISI Server card is an expansion card with eight such modems. These products add modems to communication servers and async hosts that have 32-bit PCI bus architecture.

The [Multi-Tech Systems Installation Resources](#) website has drivers for the ISI Server Cards for the following operating systems: Windows® 2000 Server and Advanced Server, Windows 2000 Professional, Windows 2003, Windows XP, Windows Vista, Windows 7, Windows Server® 2008, and Linux kernel 2.4.x. It also has instructions for using Linux kernel 2.6.x built-in drivers.

Combine ISI Server Cards to support asynchronous serial devices (local or dial-up). The ports can be used to connect basic terminals (with or without multiple pages of memory) to multiplexer channels and asynchronous modems. Each port can support as many screens as there are physical pages of memory on the terminal. Windows 2000/2003/XP/Vista/2008/7 includes a built-in *autodetect* utility that detects Multi-Tech modems and sets the proper initialization strings.



The -4 server card has one RJ-45 connector that fans out into four RJ-11 connectors, one for each of its modems. Similarly, the -8 server card has two RJ-45 connectors that fan out into eight RJ-11 connectors, one for each of its modems. Both server cards are full size add-on cards that support a high-speed interface up to 230 Kbps.

## ISI Modems

The ISI modems are compatible with the ITU-T V.92 protocol. They make quick connections and operate at downstream transmission speeds of up to 56K bps and upstream transmission speeds of up to 48K bps when connected to V.92-compatible Internet Service Providers. The V.92 protocol can send data downstream from the Internet to your computer at these speeds because data on the telephone network typically is converted from

digital to analog only once before it reaches your modem. Upstream transmissions and transmissions between client modems are limited to 33.6 Kbps.

Upstream transmissions to non-V.92-compatible ISPs and downstream transmissions that are converted more than once on the telephone line are also limited to 33.6K bps.

When calling into the ISI modem with another V92 modem over an analog phone line, the maximum speed achievable is 33.6 Kbps. V90 or V92 connections are not possible when an analog line is calling another analog line. Similarly, when the ISI modem is involved in a call between an analog line and a digital line, the higher V.90/V.92 speeds cannot be used. However, ISI modems can achieve the higher V.90/V.92 speeds when dialing out to a digital phone line that supports V.90/V.92.

**NOTE:** Though these modems are capable of 56 Kbps download performance, line impairments, public telephone infrastructure flaws, and other external technological factors currently prevent connections from reaching this maximum 56 Kbps speed.

Modems on the ISI Card are Plug and Play capable with interactive automatic dialing and command mode configuration. In standard mode, you can store up to three command lines or telephone numbers of up to 40 characters each in the modems' nonvolatile memory. The modems can dial using pulses or tones and can recognize dial tones and busy signals for reliable call-progress detection. The modems can detect AT&T calling card tones. They also have DTR dialing, remote configuration, and 11-bit capabilities, and they incorporate self-resetting lightning protection. Serial port speeds can be set as high as 230,400 bps. They are both FCC registered for connection without notification to the telephone company.

The ISI Card has full-duplex intelligent modems with V.42 error correction, V.42bis, and V.44 data compression. The ISI modems support Super G3 ITU-T V.34 fax communications at speeds up to 33.6 Kbps with Class 2.1 fax commands. The ISI modems also support voice functionality (+V commands).

## Driver Installation

If you are installing on a Windows operating system, use the Windows Installer to install the drivers before you install the hardware. Refer to [Chapter 2—Windows Installation](#) for more details.

If you are installing on a computer running a Linux operating system, install the drivers after the hardware is installed. Refer to [Chapter 4—Linux Installation](#) for more details.

## ISI Reset Utility

Download Multi-Tech's ISI Reset Utility from the [Multi-Tech Systems Installation Resources](#) website. The ISI Reset Utility allows you to reset the modems associated with the ISI Card in a computer running Windows 2000 Professional, Windows 2000 Server, Windows 2000 Advanced Server, Windows 2003, Windows XP, Windows Vista, or Windows Server 2008. Refer to [Chapter 6 – Reset Utility](#) for information on installing and using the Reset Utility.

## Technical Specifications

Category	Description
<b>Computer requirements</b>	Microsoft Windows 2003, Windows XP, Windows 2000 Professional, Windows 2000 Server and Advanced Server, Windows Vista, Windows 2008, Windows 7, Linux kernel 2.4.x or Linux kernel 2.6.x.  2 MB of hard disk space
<b>Dimensions:</b>	12.283" x 4.2" / 312 mm x 106.65 mm
<b>Baud Rates:</b>	300 bps to 230 Kbps per port

Category	Description
<b>Bus Type:</b>	ISI9234 models are PCI Express form factor 1x, PCIe 1.0 compatible. ISI5634 models are UPCI is PCI spec version 2.1 compatible.
<b>Connectors:</b>	one RJ-45 jack (female) on ISI-4; two RJ-45 jacks (female) on ISI-8
<b>Cables:</b>	The ISI-8 ships with two four-port fan-out cables. Each cable has an RJ-45 plug (male) at one end and four RJ-11 plugs (male) at the other end. The ISI-4 ships with one such four-port fan-out cable.
<b>Temperature:</b>	32° to 149° F (0° to 65° C)
<b>Approvals</b>	CE Mark R&TTE <b>EMC:</b> FCC Part 15; EN55022; EN55024 <b>Safety:</b> UL60950-1; IEC60950-1; AS/NZS 60950-1
<b>Power:</b>	250 milliamps @ +5vDC (8 ports; ISI5634UPCI-8) 1.75A @3.3v DC (8 ports; ISI5634UPCI-8) 130 milliamps @ +5v DC (4 ports; ISI5634UPCI-4) 885 milliamps @ 3.3v DC (4 ports; ISI5634UPCI-4) 700 milliamps @ 3.3v DC (4 ports; ISI9234PCIE-4) 1.20A @3.3v DC (8 ports; ISI9234PCIE-8)
<b>Interrupt Request (IRQ):</b>	One IRQ per card (can be shared)
<b>Warranty:</b>	Two years

Manufactured in Mounds View, MN, U.S.A.

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## Chapter 2 – Windows Installation

Use the procedures in this chapter to install Windows drivers **before** you install the ISI Card into a PCI slot.

**Notes:** The ISI drivers are the same for the ISI5634-UPCI and the ISI9234-PCI Express products.

After you install the drivers and hardware, you may need to configure the modems for your country/region. The procedure for doing this is in [Chapter 5—Configuring the Modems for Your Country](#).

### Downloading the Windows Drivers

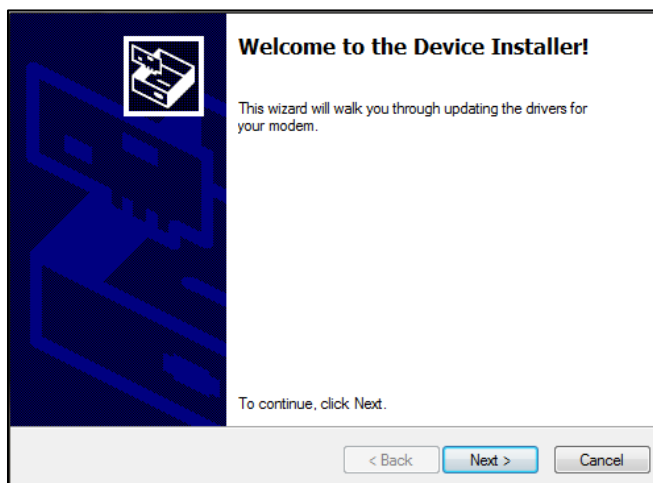
**Note:** Drivers for all Windows operating systems are included in the same zip file on the [Multi-Tech Installation Resources](#) website.

1. Login as an **administrator**. Installing a device driver modifies your system. For this reason, you must have administration rights to install the driver. If you do not have administrator rights, find someone in your organization with this authorization.
2. Go to <http://www.multitech.com/setup/product.go> and select your model from the Product drop down list.
3. Click **Drivers**.
4. Click the link for the Windows drivers.
5. **Open** the zip file and extract the files to a folder in your Program directory.

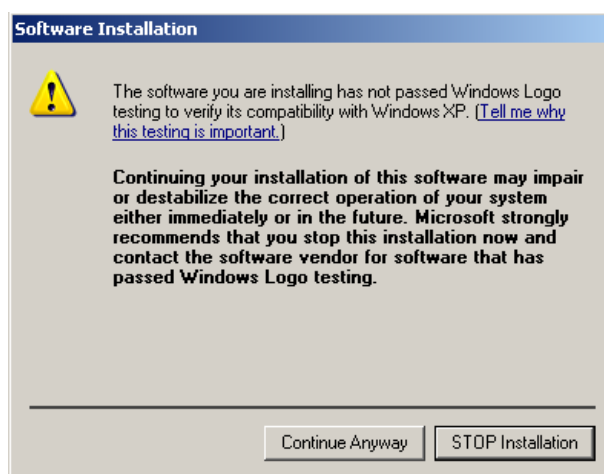
**Note:** To select the correct drivers, you will need to know if you have a 32-bit or 64-bit operating system. If you do not know which version you have, Microsoft's Knowledge Base has steps for identifying the version.

### Using the Windows Installer

1. Open the folder where you extracted the zip files.
2. Double-click **Drivers** and then double-click the folder for your operating system. Options are:
  - Win32bit-Vista-2008-Win7
  - Win32bit-XP-2003
  - Win64bit-amd-Vista-2008-Win7
  - Win64bit-amd-XP-2003
  - Win64bit-ia-Vista-2008-Win7
  - Win64bit-ia-XP-2003
3. Double-click **dpinst.exe** to run Device Installer.
4. Click **Yes** when prompted to confirm that you want to run the file.
5. Click **Next** to start the driver installation.

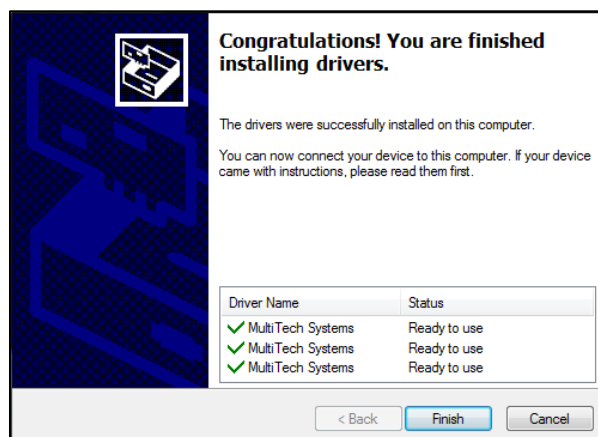


6. Click **Continue Anyway** each time you are shown the Windows Logo testing window.



There will be a transitory screen, then the process will complete.

7. Click on the **Finish** button. Your driver installation is complete.



8. If you have not already done so, you can now shut down the PC, unplug the power cord and physically install your ISI card per the instructions found in [Chapter 3 – Hardware Installation](#).



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## Chapter 3 – Hardware Installation

This chapter describes how to install a Multi-Tech ISI as an expansion card in your PCI-bus computer.

### Telecom Safety Warnings

- This product must be installed by a qualified service person.
- Never install telephone wiring during a lightning storm.
- Never install a telephone jack in wet locations unless the jack is specifically designed for wet locations.
- This product is to be used with UL and cUL listed computers.
- Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- Use caution when installing or modifying telephone lines.
- Avoid using a telephone during an electrical storm. There may be a remote risk of electrical shock from lightning.
- Do not use a telephone in the vicinity of a gas leak.
- To reduce the risk of fire, use only 26 AWG or larger telecommunication line cord.
- This product must be disconnected from its power source and telephone network interface when servicing.

## Hardware Installation Procedures

**NOTE:** If you are using a Windows operating system, use Windows Installer to install drivers before you install the ISI Card into a PCI slot. Refer to [Using the Windows Installer](#) in Chapter 2 – Windows Installation for more information.

If you are using Linux, install the hardware and then install the drivers. Refer to [Chapter 4 – Linux Installation](#) for more information.

To install the ISI Card into your PCI-bus computer, follow the steps presented below.

1. Turn off your computer.
2. Remove the power cord and any peripheral equipment connected to the computer.



3. Remove the cover of your computer as instructed in your computer's documentation.

---

**Before handling the ISI Card, discharge any static in your body by touching a piece of grounded metal such as the computer chassis. Electrostatic discharge (ESD) is the release of stored static electricity that can damage electrical circuitry or components. Static electricity is often stored in your body and discharged when you come in contact with an object of a different potential.**

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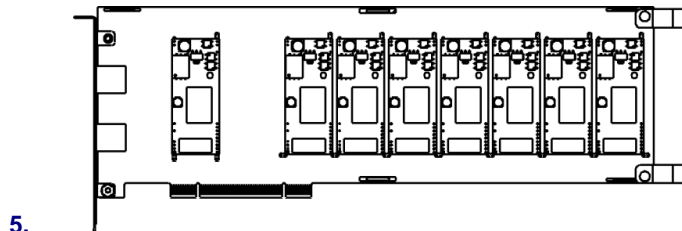



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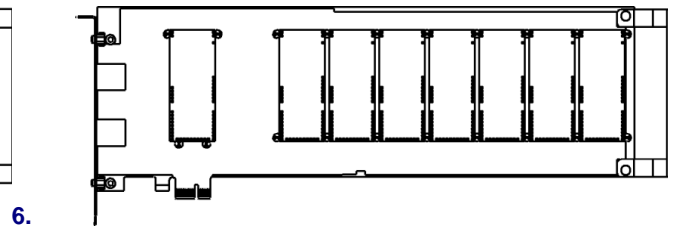
**Perform the procedure described in this section only at an ESD workstation using an antistatic wrist strap. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal ground screw (lug).**

---

4. Carefully remove the ISI Card from its antistatic bag. Handle it only by the mounting bracket and edges. Do not touch the gold-plated connectors along the bottom edge. (You may want to save packaging for possible future use.)



ISI5634UPCI-8

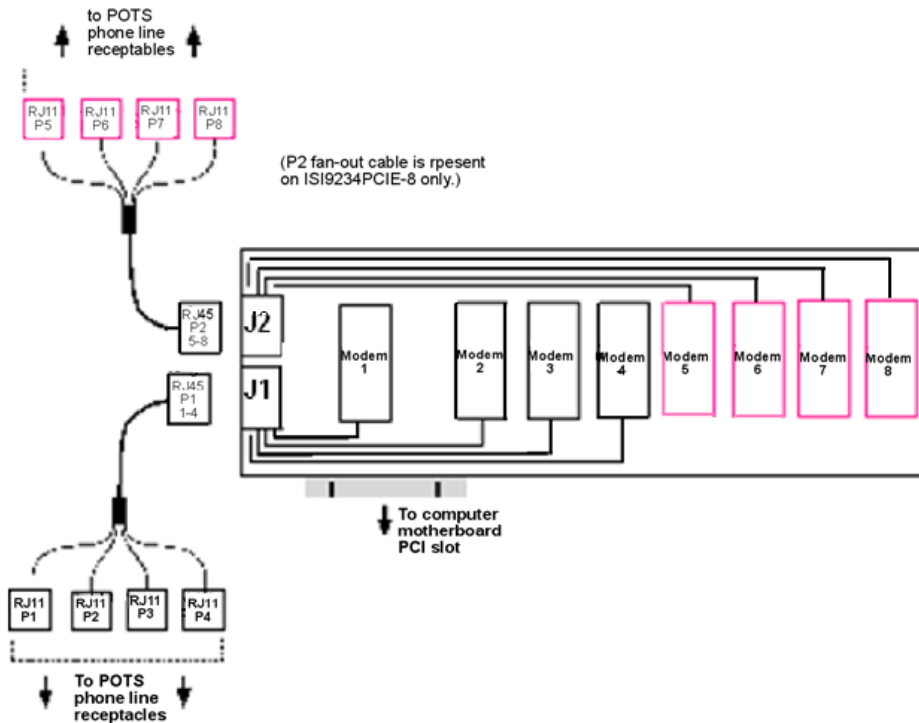


ISI9234PCIe-8

7. Remove the slot cover for the unused PCI slot where you will install the ISI Card. Refer to your computer's manual for instructions on removing the slot cover.
8. Install the ISI Card into the selected expansion slot in the same manner as any other add-on card. Refer to your computer's manual for instructions on adding cards.

9. Fasten the retaining bracket to the computer chassis and replace cover on the computer.
10. Cable the card. The -4 ISI Server card has one RJ-45 receptacle and one fan-out cable. The -8 ISI Server card has two RJ-45 receptacles and two fan-out cables. Each fan-out cable extends connections for four modems from the RJ-45 plug to four RJ-11 plugs.
  - a. Attach each RJ-11 plug to a phone line receptacle.
  - b. Attach the RJ-45 connector into the appropriate RJ45 receptacle on the ISI Server card.

To view a pin out diagram of the ISI Server Card Fan-Out Cables, see [Appendix A](#) of this manual.



**Fan-Out Cable for ISI Server Card**

## Chapter 4 – Linux Installation

There are two options for installing Linux drivers:

- For **Linux kernel version 2.6.8 or higher**, use the driver that is built-in to the Linux kernel. The download explains how to configure the driver.
- For **Linux kernel version 2.4.x**, you will need to download drivers from the Multi-Tech Installation Resources website. Multi-Tech's version 1.01 driver for the ISI Cards works with the 2.4.x Linux kernel. It has been tested with RedHat Release Versions 7.3, 8.0, and 9.0.

### System Requirements, Prerequisites, & Conditions of Use

Category	Description
Hardware Platform:	Intel x86
Linux kernel version:	2.4.x or later
GNUC Compiler version:	2.72 or later
ISI capacity per computer:	Up to 4 boards
Driver type:	For Linux kernel 2.4.x, use Multi-Tech driver only; do not use any drivers included with the Linux OS (like Exar drivers).  For Linux kernel 2.6.8 or higher, use Linux drivers.
Full Linux Installation:	For the ISI Card to operate properly, all components of the Linux OS should be installed. If the ISI Card does not operate properly in a Linux installation where some components are missing, then those missing Linux components should be added and the ISI Card should be uninstalled and re-installed.  <b>NOTE:</b> The 'make' utility, the GNU C compiler, and the kernel sources need to be installed on your system. If any of these are missing, the compilation will fail. Most later Linux OSs install these elements automatically. For best results, the Linux OS installation should include all elements.

### Using Built-in Drivers for Linux Kernel 2.6.8 and Higher

Instructions for using the built-in Linux drivers are available in the Multi-Tech Installation Resource website:

1. Go to <http://www.multitech.com/setup/product.go> and select your model from the Product drop down list.
2. Click Drivers.
3. Click [isi\_upci\_pcie\_linux\_26x] to open a text file.

## Using Multi-Tech Drivers for Linux Kernel 2.4.x

The installation process includes building the driver, creating tty device names, and loading the driver module. This section describes how to make an installer to complete these steps. If you would prefer to install the driver manually, consult the ReadMe file that accompanies the tar file on the [Multi-Tech Installation Resources](http://www.multitech.com/setup/product.go) website.

**Note:** All Linux line command expressions are case-sensitive. The commands shown in this procedure will work only if you use capital letters and lower-case letters exactly as shown.

### Making a Driver Installation File

1. Go to <http://www.multitech.com/setup/product.go> and select your model from the Product drop down list.
2. Click **Drivers**.
3. Click **[isi\_upci\_linux\_104.tar.gz]** and save the file to your computer.

4. Create a temporary directory:

```
"mkdir /mtsi_upci"
```

5. Copy the tar file to the temporary directory:

```
"cp ISI_U_PCI_LINUX_V_104.tar.gz /mtsi_upci"
```

6. Go to the temporary directory:

```
"cd /mtsi_upci"
```

7. Untar the file. This will unzip the source files to the "mtsi\_upci\_driver" directory.

```
"tar xvfz ISI_U_PCI_LINUX_V_104.tar.gz"
```

8. Switch to the newly created directory:

```
"cd mtsi_upci_driver"
```

9. Run the make install script.

The script creates the driver module and tty devices. It modifies the rc files, so the driver loads automatically on system reboot. The script also creates the ttyMUXy ports. When the script has finished running, it displays "Multi-Tech ISI driver loaded successfully YY" and lists the ports it created. If this message and a list of ports do not appear, look for error messages.

---

## Chapter 5 – Configuring the Modems for your Country

Different countries have different requirements for how modems must function. Therefore, before you use the modems in your ISI Card, you must configure them to match the defaults of the country in which you are using them. Use the Global Wizard to configure each modem as described below. The Global Wizard configuration utility works with computers running Windows 2000/2003/XP/Vista/2008/7.

### Installing the Global Wizard

1. Go to <http://www.multitech.com/setup/product.go> and select your model from the Product drop down list.
2. Click **Software**.
3. Click **Global Wizard** link.
4. Click **Run** twice. The Global Wizard installer launches.
5. Click **Next**.
6. Click **Yes**.
7. Click **Next**.
8. Click **Finish**. This completes the Global Wizard installation.

### Using the Global Wizard

1. Click **Start | All Programs | Global Wizard** and select **Global Wizard**. The Global Wizard opens.
2. Click **Next**. The Global Wizard searches for your modems and identifies them.
3. Click **Next**. Select a modem to configure.
4. Click **Next**.
5. Select the country in which the modem will be used and click **Next**.
6. Review your choice of country. If it is correct, click **Next** to configure the modem.
7. When Global Wizard announces that the parameters have been set, click **Finish** to exit.
8. Repeat Steps 3 through 7 for each modem on the ISI Card.

## Chapter 6 – Reset Utility

The Reset Utility allows you to reset a single modem or all the modems.

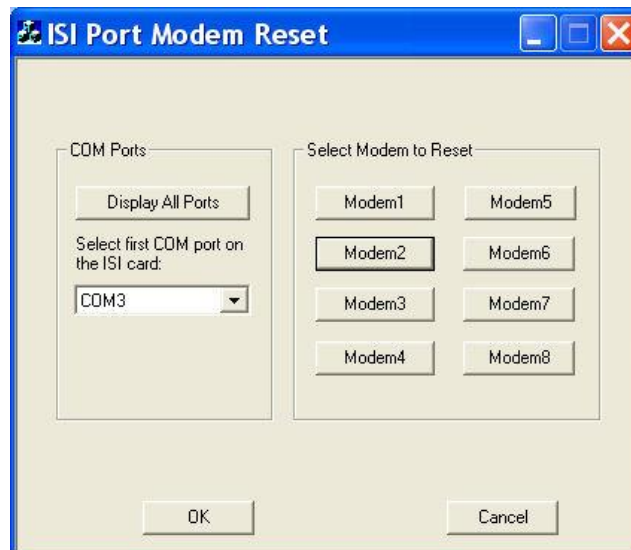
**Prerequisite:** The ISI drivers must be installed before the Reset Utility can function.

### Using the Windows Port Reset Utility

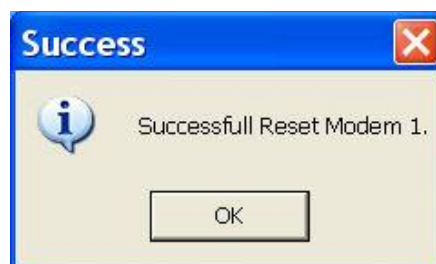
**Note:** Any other utility accessing the first com port needs to be closed before you can access the first com port in the Reset Utility.

1. Go to <http://www.multitech.com/setup/product.go> and select your model from the Product drop down list.
2. Click **Software**.
3. Click the Reset Utility link, **ISIPortModemReset.exe**.
4. Save the file to a TEMP directory.
5. Disable any application using the ISI modem for communication.
6. Run **ISIPortModemReset.exe**.

The ISI Port Modem Reset utility opens. By default, the COM Ports drop down list shows just the COM ports on the ISI card. If you want to display all the COM ports in the drop down list, click **Display All Ports**.



7. Select the first COM port listed on the **ISI Card displays the COM ports** drop down list, for example, COM3.
8. Click the **Modem#** button for the modem that you want to reset. The following message displays if the modem is successfully reset.



If you did not select the first COM port, the following error message displays.



## Using the Linux Port Reset Utility

The port-reset utility allows you to reset ports and modems without rebooting.

To reset a serial port, the DTR pin is set to the low logic level for one second. To reset the modem port, the Reset pin is toggled (i.e., its logic state is inverted and then restored).

To reset the port (for a serial card) or modem (from modem card)

- Run the reset port command:

```
"resetport /dev/ttyMUxy"
```

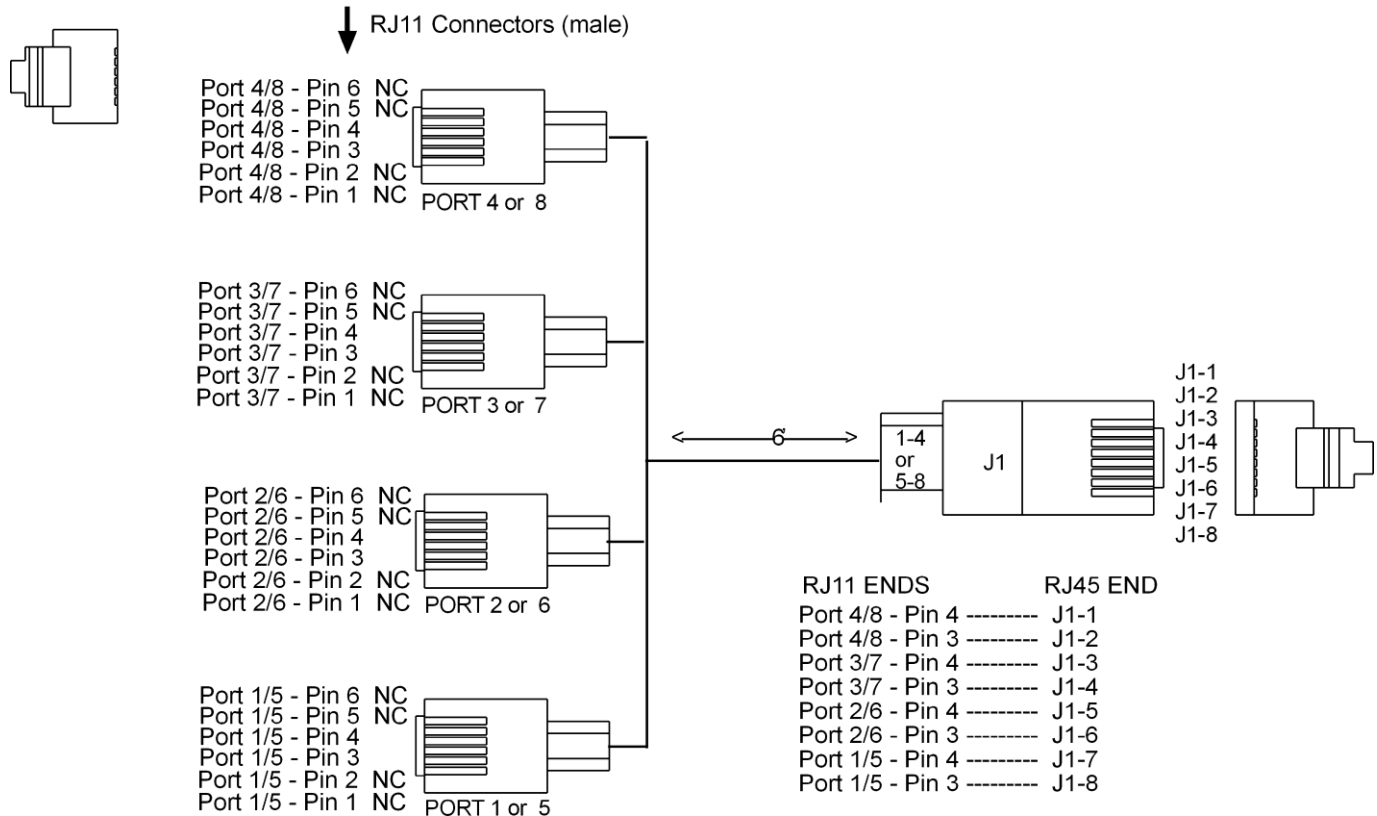
Where 'x' stands for card number and 'y' for the port number.

On the Modem Cards, the DTRLED will toggle indicating that the reset has occurred. This toggling might be observable on the modem attached to the port, if the modem is equipped for this indication. There is no similar indication of successful reset on the modem cards.



# Appendix A – Cable Wiring Diagrams

The four modems on the ISI-4 are attached to phone receptacles by a single fan-out cable that has an RJ45 connector on one end (which connects to the card) and four RJ11 connectors on the other end (which connect to phone receptacles). The eight modems ISI-8 are served by two such fan-out cables. The pin out for the fan-out cable is shown below.



Pin out for ISI Fan-Out Cable

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## Appendix B – Regulatory Compliance

### FCC Part 15

This equipment has been tested and found to comply with the limits for a **Class B** digital device, pursuant to 47 CFR Part 15 regulations. The stated limits in this regulation are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Plug the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the CFR 47 rules. Operation of this device is subject to the following conditions:

- (1) This device may not cause harmful interference, and
- (2) this device must accept any interference that may cause undesired operation.

**Warning:** Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.



### EMC, Safety, and R&TTE Directive Compliance

The CE mark is affixed to this product to confirm compliance with the following European Community Directives:

Council Directive 2004/108/EC of 15 December 2004 on the approximation of the laws of Member States relating to electromagnetic compatibility;

and

Council Directive 2006/95/EC of 12 December 2006 on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits;

and

Council Directive 1999/5/EC of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity.

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## **Appendix C – Environmental Information**

### **Waste Electrical and Electronic Equipment (WEEE) Statement**

**July, 2005**

The WEEE directive places an obligation on EU-based manufacturers, distributors, retailers and importers to take-back electronics products at the end of their useful life. A sister Directive, ROHS (Restriction of Hazardous Substances) complements the WEEE Directive by banning the presence of specific hazardous substances in the products at the design phase. The WEEE Directive covers all Multi-Tech products imported into the EU as of August 13, 2005. EU-based manufacturers, distributors, retailers and importers are obliged to finance the costs of recovery from municipal collection points, reuse, and recycling of specified percentages per the WEEE requirements.

### **Instructions for Disposal of WEEE by Users in the European Union**

The symbol shown below is on the product or on its packaging, which indicates that this product must not be disposed of with other waste. Instead, it is the user's responsibility to dispose of their waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or where you purchased the product.



## REACH Statement

### Registration of Substances:

After careful review of the legislation and specifically the definition of an “article” as defined in EC Regulation 1907/2006, Title II, Chapter 1, Article 7.1(a)(b), it is our current view Multi-Tech Systems, Inc. products would be considered as “articles”. In light of the definition in § 7.1(b) which requires registration of an article only if it contains a regulated substance that “is intended to be released under normal or reasonable foreseeable conditions of use,” our analysis is that Multi-Tech Systems, Inc. products constitute nonregisterable articles for their intended and anticipated use.

### Substances of Very High Concern (SVHC):

Per the candidate list of Substances of Very High Concern (SVHC) published October 28, 2008 we have reviewed these substances and certify the Multi-Tech Systems, Inc. products are compliant per the EU “REACH” requirements of less than 0.1% (w/w) for each substance.

If new SVHC candidates are published by the European Chemicals Agency, and relevant substances have been confirmed, that exceeds greater than 0.1% (w/w), Multi-Tech Systems, Inc. will provide updated compliance status.

Multi-Tech Systems, Inc. also declares it has been duly diligent in ensuring that the products supplied are compliant through a formalized process which includes collection and validation of materials declarations and selective materials analysis where appropriate. This data is controlled as a part of a formal quality system and will be made available upon request. Restriction of the Use of Hazardous Substances (RoHS)

## Restriction of the Use of Hazardous Substances (RoHS)



**Multi-Tech Systems, Inc.**

### Certificate of Compliance

#### 2002/95/EC

Multi-Tech Systems, Inc. confirms that this product now complies with the chemical concentration limitations set forth in the directive **2002/95/EC** of the European Parliament (Restriction Of the use of certain Hazardous Substances in electrical and electronic equipment - **RoHS**)

These Multi-Tech Systems, Inc. products do not contain the following banned chemicals:

Lead, [Pb] < 1000 PPM

Mercury, [Hg] < 1000 PPM

Hexavalent Chromium, [Cr+6] < 1000 PPM

Cadmium, [Cd] < 100 PPM

Polybrominated Biphenyl, [PBB] < 1000 PPM

Polybrominated Diphenyl Ether, [PBDE] < 1000 PPM

### Notes:

1. Lead usage in some components is exempted by the following RoHS annex; therefore, higher lead concentration could be found.
  - a. Lead in high melting temperature type solders (i.e., tin-lead solder alloys containing more than 85% lead).
  - b. Lead in electronic ceramic parts (e.g., piezoelectronic devices).

## China ROHS

### 依照中国标准的有毒有害物质信息

根据中华人民共和国信息产业部 (MII) 制定的电子信息产品 (EIP) 标准—中华人民共和国《电子信息产品污染控制管理办法》（第 39 号），也称作中国 RoHS，下表列出了 Multi-Tech Systems Inc. 产品中可能含有的有毒物质 (TS) 或有害物质 (HS) 的名称及含量水平方面的信息。

成分名称	有害/有毒物质/元素					
	铅 (PB)	汞 (Hg)	镉 (CD)	六价铬 (CR6+)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷电路板	O	O	O	O	O	O
电阻器	X	O	O	O	O	O
电容器	X	O	O	O	O	O
铁氧体磁环	O	O	O	O	O	O
继电器/光学部件	O	O	O	O	O	O
IC	O	O	O	O	O	O
二极管/晶体管	O	O	O	O	O	O
振荡器和晶振	X	O	O	O	O	O
调节器	O	O	O	O	O	O
电压传感器	O	O	O	O	O	O
变压器	O	O	O	O	O	O
扬声器	O	O	O	O	O	O
连接器	O	O	O	O	O	O
LED	O	O	O	O	O	O
螺丝、螺母以及其它五金件	X	O	O	O	O	O
交流-直流电源	O	O	O	O	O	O
软件/文档 CD	O	O	O	O	O	O
手册和纸页	O	O	O	O	O	O
底盘	O	O	O	O	O	O

**X** 表示所有使用类似材料的设备中有害/有毒物质的含量水平高于 SJ/Txxx-2006 限量要求。

**O** 表示不含该物质或者该物质的含量水平在上述限量要求

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